

ce/pets

JC20 Rec'd PGT/PTO 31 OCT 2005

DESCRIPTION

GAMING MACHINE

TECHNICAL FIELD

The present invention relates to a gaming machine provided with observation windows, through which symbols are observed and any one of which is appropriately chosen in accordance with the progress of game.

BACKGROUND ART

Japanese Patent Publication No. 7-114824B discloses a game reel on an outer peripheral face of which plural symbols are provided. In this game reel, for example, at least either of the symbols and their background portions is colored with light-storage ink that has the property of emitting a light by absorbing, accumulating, and radiating the light.

Japanese Patent No. 2673790 discloses that symbols printed on a film is thermally transferred onto a ring member which is to be a symbol drum. This symbol drum is provided to the symbol displaying unit, and the rotation is controlled by a pulse-controlled driving motor. While sensing a rotation reference position by a sensor, this symbol drum is stopped in an appropriate position to display the symbols precisely. The ultraviolet-light emitting lamp is arranged on the inside of the symbol drum. The symbol painted in luminous ink is displayed clearly and effectively to emit the light when the pattern is irradiated from the

inside.

Japanese Utility Model No. 2589966 discloses a rotating display member that is installed in the gaming machine rotatably about a rotary shaft, and displays a symbol provided thereon in a display window of a gaming machine. The fluorescent display pattern portion is provided to this rotating display member on an outer peripheral portion of the rotating member. This fluorescent display pattern portion is drawn in ink that is kept in white color under a visible light and emits fluorescent color when irradiated with the ultraviolet light emitted from the lamp arranged on the inside of the rotating member.

In the conventional arts, the symbols are depicted in ink that has self-luminous property, nevertheless the symbols are not always used for different purposes to draw plural types of lotteries. When it is possible for the player to observe a single reel from plural directions, the player can draw plural types of lotteries by using the symbols for different purposes. As a result, there is a possibility that new game presentations can be found.

DISCLOSURE OF THE INVENTION

It is an object of the present invention to provide a gaming machine provided with observation windows through which symbols are observed, and is capable of stimulating the player's interest by choosing appropriately any one of observation windows in accordance with the progress of game.

In order to achieve the above object, according to the invention, there is provided a gaming machine, comprising:

a plurality of reels, each of which variably presents a plurality of symbols;

and

a cover body, formed with a plurality of observation windows, the cover body covering the reels such that the reels are selectively viewed through one of the observation windows in accordance with a condition of a game.

With this configuration, since the observation windows are provided at plural locations in the cover body, it is possible for the player to observe the same reel from different directions. Then, if any one observation window is chosen appropriately from the observation windows in accordance with the progress of game, the lottery and the symbol display can be achieved while making abundant variations. For example, if the symbols to be observed by the player are allocated separately to respective observation windows, it is feasible for the player to select appropriately plural types of lotteries. As a result, new game presentations can be realized.

According to the invention, there is also provided a gaming machine, comprising:

a plurality of rotatable reels, each having an outer periphery on which a plurality of symbols are provided; and

a cover body, formed with a plurality of observation windows, the cover body covering the reels such that the reels are selectively viewed through one of the observation windows in accordance with a condition of a game.

With this configuration, since the observation windows are provided at plural locations in the cover body, it is possible for the player to observe the same reel from different directions. Then, if any one observation window is chosen appropriately from the observation windows in accordance with the progress of game, the lottery and the symbol display can be achieved while making abundant

variations. For example, if the symbols to be observed by the player are allocated separately to respective observation windows, it is possible for the player to select appropriately plural types of lotteries. As a result, the new game presentations can be realized.

Preferably, the gaming machine further comprises: a first light source, disposed inside the reels to emit visible light; and a second light source, disposed outside the reels to emit ultraviolet light. The symbols provided with the reels includes first symbols visualized by the visible light and second symbols visualized by the ultraviolet light. The observation windows includes a first observation window through which the first symbols are viewed, and a second observation window through which the first symbols and the second symbols are viewed.

With this configuration, since any one of the visible light and the ultraviolet light is selected appropriately and irradiated, the symbols to be observed by the user can be used separately. That is, since the symbols to be displayed on the first observation window and the second observation window are visualized or invisualized by irradiating any one of the visible light and the ultraviolet light onto the reel in accordance with the progress of game, any of the observation windows provided at plural locations can be selected appropriately. Therefore, plural types of lotteries can be done selectively by the same reel while using the symbols appropriately. As a result, the new game presentations can be realized.

It is further preferable that the gaming machine further comprises a mirror member, which provides reflected virtual images as the first symbols viewed through the first observation window.

With this configuration, the first symbols can be displayed on the first

observation window in the direction along which it is difficult to display such first symbols because of a layout of the gaming machine.

It is further preferable that the gaming machine further comprises a display, disposed behind the mirror member when viewed from the first observation window. The mirror member is a half mirror, so that an image provided by the display and transmitted through the half mirror is superposed on each of the reflected virtual images, as the first symbols viewed through the first observation window.

With this configuration, the symbols can be displayed on the first observation window to have abundant variations. Therefore, such display can arouse the player's interest in game.

It is also preferable that each of the first symbols is provided on the outer periphery of each of the reels as an inversion image.

With this configuration, the virtual image reflected by the mirror member can be displayed on the first observation window like the real image.

Preferably, the game includes a first game, and a second game activated in accordance with a result of the first game.

With this configuration, the player's feeling of expectation for the second game that is executed dependent on the result of the first game can be enhanced.

Here, it is further preferable that the second game is activated in a case where the first symbols viewed through the first observation window are matched with a first predetermined pattern when the reels are stopped.

With this configuration, the player can have a feeling of expectation about such an event that a particular symbol group is stationarily displayed in the first game.

It is also preferable that the second light source is turned on in a case where the second game is activated, to perform a special lottery operation with the second symbols viewed through the second observation windows. The special lottery operation is performed before the second game is executed.

With this configuration, since a behavior of the special lottery can be observed through the second observation window, the lottery that can have abundant variations and arouse the player's interest can be executed. Also, since plural types of lotteries can be executed by the same reel, a reduction in size of an overall gaming machine can be achieved.

It is also preferable that the special lottery operation determines at least one of: the number of the second game to be executed; odds to be provided in a case where a player wins the second game by matching the second symbols viewed through the second observation window with a second predetermined pattern when the reels are stopped; and the number of the second predetermined pattern.

With this configuration, the game presentation can be given in determining the conditions that are applied to execute the second game. As a result, the player can have a strong feeling of expectation about in what way the second game should be executed.

It is also preferable that each of the second symbols is provided in a blank region on the outer periphery of each of the reels, so that the second symbols serve as a blank symbol in a case where the first game and the second game are executed.

With this configuration, a large number of symbols can be depicted on the outer peripheral faces of the reels. Also, since the second symbol is visualized

by the ultraviolet light, such second symbol is not visualized in the first and second games that employ the visible light. Therefore, the second symbol can be used as the blank symbol in the first and second games.

It is also preferable that the reels are rotated in a first direction in a case where the first game is executed, and are rotated in a second direction opposite to the first direction in a case where the special lottery operation and the second game are executed.

With this configuration, the same reel can be used separately in the normal lottery and the special lottery that are carried out in executing the first and second games. That is, normally the reel is rotated in such a manner that the symbols are moved from the upper side to the lower side. In the case where the reflected virtual image of the first symbol is displayed on the first observation window, the reflected virtual image is observed through the eyes of the player such that, when the reel is rotated in the ordinary manner, the reflected virtual image moves from the lower side to the upper side. For this reason, in the case of the normal lottery executed by displaying the first symbol in a variable way, the reel should be rotated in the opposite direction to the normal direction. In contrast, in the case of the special lottery, the physical reels may be rotated normally since the real image of the second symbol is displayed on the second observation window.

Preferably, the second observation window comprises a filter which reduces a light amount transmitted therethrough.

With this configuration, when the visible light is radiated onto the reel in the first and second games, such a situation can be avoided that the first symbol is displayed on the second observation window by the visible light that is leaked from the inside of the reel. On the contrary, when the ultraviolet light is radiated onto

the reel, the second symbol can be displayed on the second observation window.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view schematically showing a gaming machine according to one embodiment of the invention;

Fig. 2 is a section view of the gaming machine of Fig. 1;

Fig. 3 is a block diagram showing electrical configuration of the gaming machine of Fig. 1;

Fig. 4 is a flow chart showing operations in a primary game executed in the gaming machine of Fig. 1;

Fig. 5 is a flow chart showing operations in presentations of lottery for contents of a secondary game executed in the gaming machine of Fig. 1; and

Fig. 6 is a flow chart showing operations in the secondary game executed in the gaming machine of Fig. 1.

BEST MODE FOR CARRYING OUT THE INVENTION

One embodiment of the present invention will be explained below in detail with reference to the accompanying drawings.

- As shown in Figs. 1 and 2, a gaming machine 1 of the present embodiment includes a casing body 2 and a reel unit 3 having three physical reels 3a, 3b, 3c on the upper side of this casing body 2 on this sheet of paper. Main symbols visualized when irradiated with a visible light and sub symbols visualized when irradiated with ultraviolet light are provided to outer peripheral faces of the

physical reels 3a, 3b, 3c.

The main symbols are depicted on outer peripheral faces of the physical reels 3a, 3b, 3c as inversion images that are reflected with a half mirror described later to display. The sub symbol is depicted on the outer peripheral faces of the physical reels 3a, 3b, 3c between the main symbols or in a blank position. In this manner, a large number of symbols can be depicted on the outer peripheral faces of the physical reels. Also, the sub symbols are not visualized in primary and secondary games using the visible light because such sub symbols are visualized by the ultraviolet light. Therefore, the sub symbols can be used as the blank symbol in the primary and secondary games.

Visible light lamps 3d are provided to the reel unit 3 as a visible light source that emits visible light onto inner peripheral faces of the physical reels 3a, 3b, 3c respectively. In the primary and secondary games, only the main symbols are visualized by activating the visible light lamps 3d and the sub symbols that are in their invisible state are caused to act as the blank symbol.

A first observation window 5a through which the player observes the main symbols is provided in the position that is lower than lower ends of the physical reels 3a, 3b, 3c under the reel unit 3 in the drawing. A half mirror 5b for reflecting the main symbols on the physical reels 3a, 3b, 3c is provided to the inner side of the first observation window 5a when viewed from the player side. A liquid crystal display 5c is provided to the further inner side of the half mirror 5b. That is, an image to be observed from the liquid crystal display 5c through the half mirror 5b and a reflected virtual image of the main symbol transmitted from the half mirror 5b are superposed, and a superposed image is displayed on the first observation window 5a. In this way, because the image to be observed from the liquid crystal

display 5c through the half mirror 5b and the reflected virtual image of the main symbol transmitted from the half mirror 5b are superposed, the image can be displayed on the first observation window 5a while making abundant variations.

Because there is a limit to a space to provide two observation windows directly on the face of the reel, it is not always possible to confirm simply the symbols from the point of view of the player. Therefore, the present invention overcomes the disadvantage that seems to occur in confirming the symbols, by employing such a configuration that the first observation window is provided in the position remote from the reel and is utilized in forming the reflected virtual image.

In this case, the liquid crystal display 5c may be formed of a CRT (Cathode-Ray Tube), a PDP (Plasma Display Panel), or the like, in addition to the liquid crystal panel.

A second observation window 7a is provided on the upper side of the first observation window 5a in the drawing. The second observation window 7a displays a real image of the sub symbol on the physical reels 3a, 3b, 3c. A set of black lights 7b for irradiating one type of ultraviolet light to the outer peripheral faces of the physical reels 3a, 3b, 3c are provided to an upper end portion and a lower end portion of the second observation window 7a. One type of ultraviolet light is irradiated onto the physical reels 3a, 3b, 3c by operating these black lights 7b, and then the real image of the sub symbol that is visualized by the irradiation of one type of ultraviolet light is displayed on the second observation window 7a.

Here, the second observation window 7a may have a filter to limit a quantity of transmitted light. Accordingly, it can be avoided that the main symbol is displayed on the second observation window 7a on account of the visual light, which is leaked from the inner side of the physical reels 3a, 3b, 3c, in a situation

that the physical reels 3a, 3b, 3c are irradiated with the visual light in the primary and secondary games.

An operation panel 8 that the player uses to play various games is provided to the lower side of first observation window 5a. A slot into which a medal, a coin, or the like is put, a button used to bet, a start button used to rotate the physical reels 3a, 3b, 3c, and the like are provided to the operation panel 8.

As shown in Fig. 3, the gaming machine 1 is constructed electrically by a main board A and a sub board B. In the main board A, a CPU 30 has a ROM 31 and a RAM 32 and executes a control operation in compliance with a prestored program. In addition to the control program for controlling an operation of the gaming machine 1, a prize-group random selection table used to execute the prize-group preliminary decision (internal lottery), and the like are stored in the ROM 31.

There are provided a clock generating circuit 33 for generating a reference clock pulse and a random-number generating circuit 34 for generating a predetermined random number are connected to the CPU 30. A control signal sent out from the CPU 30 is output to a medal payout device 36, which executes the payout of a medal, and a display controlling circuit 37a via an output port 35. The display controlling circuit 37a controls operations of the reel unit 3, the visible light lamps 3d, and the ultraviolet light lamps 7b (black lights).

• Signals being output from a medal discriminating device 38, which discriminates whether or not the medal is true, a payout medal counter 40, which counts the number of payout medals, and a start button 41, which causes the reel to start the rotation, are input into the CPU 30 via an input port 43. The signal output from the CPU 30 is output to the sub board B via a data sending-out circuit

46 under control of an output timing control circuit 45 that controls a signal output timing to the sub board B.

In the sub board B, a signal output from the data output circuit 46 is input into a data input circuit 47. The signal input into the data input circuit 47 is processed by a CPU 48. A clock generating circuit 49 for generating a reference clock pulse, a control/image ROM 50 for recording various programs and image data, and a RAM 51 are connected to the CPU 48. Data about the image are output to the liquid crystal display 5c from the CPU 48 via a displaying circuit 52 that executes an image processing, and the like. Characters, still images, moving images, etc. are displayed on the liquid crystal display 5c. Also, data about the sound are output to an amplifier circuit 56 from the CPU 48 via a sound LSI 54 that executes a sound processing, and the like. The sound LSI 54 extracts necessary sound data from a sound ROM 55 and executes the processing of sound data. The sound data are subjected to the processes such as amplification, etc. in the amplifier circuit 56, and then are output to a speaker 58 via a sound adjusting circuit 57 that executes control of the sound.

Next, an operation of the gaming machine according to the present embodiment constructed as above will be explained below with reference to flowcharts shown in Figs. 4 to 6.

First, the visible light lamps 3d are turned on to radiate the visible light onto inner faces of the physical reels 3a, 3b, 3c. Thus, the main symbols depicted on the outer peripheral faces of the physical reels 3a, 3b, 3c are visualized, then reflected by the half mirror 5b, and then displayed on the first observation window 5a. In contrast, the black lights 7b are turned off and thus no symbol cannot be observed on the second observation window 7a. Then, the

player puts the medal into the slot (step S1). The inserted medal is accumulated as credit (step S2). Then, the player depresses the bet button (step S3) to determine the number of bets (step S4). Then, the start button is depressed (step S5), and the primary game is started.

As soon as the start button is depressed, the CPU 30 carries out the internal lottery (normal lottery) based on the random number output from the random-number generating circuit 34, and determines an arrangement of symbols (step S6). Then, the rotation of the mechanical reels (physical reels 3a, 3b, 3c) is started (step S7). After a predetermined time period has elapsed, three physical reels 3a, 3b, 3c are stopped sequentially. That is, the first physical reel is stopped (step S8), then the second physical reel is stopped (step S9), and finally the third physical reel is stopped (step S10).

After all physical reels 3a, 3b, 3c are stopped, it is determined whether or not the player hit a prize for a free game as a secondary game (step S11). In the present embodiment, assumed that special symbols are displayed on the first observation window 5a as the requirement for hitting the free game prize. In step S11, if the player fails to hit the free game prize, the game is over. On the other hand, if the player hits the free game prize, the lottery for contents of the free game is activated (step S12). Then, the lottery of the number of selectable payline (step S13), the lottery of the number of games to be played (step S14), and the lottery of the odds to be effected (step S15) are executed.

The presentations of the lottery for the contents of the free game are executed based on a flowchart shown in Fig. 5. First, the visible light lamps 3d are turned off to eliminate the reflected virtual images of the physical reels 3a, 3b, 3c that are reflected by the half mirror 5b and then projected onto the first

observation window 5a (step T1). Then, the black lights 7b are turned on (step T2). Accordingly, the physical reels 3a, 3b, 3c are not displayed on the first observation window 5a, but the physical reels 3a, 3b, 3c are displayed on the second observation window 7a. Then, the counter rotation of the physical reels 3a, 3b, 3c is started (step T3).

In this manner, the same reels are used separately in the normal lottery and the special lottery (the lottery for the contents of the free game) by changing the rotating direction of the physical reels 3a, 3b, 3c. In other words, in the case of the normal lottery, since the reflected virtual image of the main symbol is displayed on the first observation window 5a, the physical reels 3a, 3b, 3c are rotated in the direction along which the real image of the symbol is moved from the lower side to the upper side. In contrast, in the case of the special lottery, the real image of the sub symbol is displayed on the second observation window 7a, the physical reels 3a, 3b, 3c are rotated in the direction along which the real image of the symbol is moved from the upper side to the lower side.

Then, as the result of the internal lottery made by the CPU30 and the random-number generating circuit 34, the second reel is stopped in accordance with the result of the number-of-games lottery (step T4). Then, as the result of the internal lottery, the first reel is stopped in accordance with the result of the number-of-paylines lottery (step T5). Then, as the result of the internal lottery, the third reel is stopped in accordance with the result of the odds lottery (step T6). Then, the black lights are turned off (step T7), and then the visible light lamps 3d are turned on to project the reflected virtual images of the physical reels 3a, 3b, 3c onto the first observation window 5a (step T8).

In this way, as the result of the normal lottery, when the special symbols

appear on the first observation window 5a and stop there, the sub symbols appear on the second observation window and then the special lottery is executed. Therefore, with the advent of the special symbol as a start, the special lottery that is different and independent from the normal lottery can be executed by using the same physical reels 3a, 3b, 3c. Accordingly, the lottery that have abundant variations and arouse the player's interest can be carried out. Also, since plural types of lotteries can be executed by using the same physical reels 3a, 3b, 3c, a reduction in size of the overall gaming machine can be achieved.

Also, as described above, the number of games to be played, the number of selectable paylines or the winning odds are determined, and then the free game is executed based on the determined number of games, the determined number of selectable paylines and the determined winning odds. Therefore, a game aspect can be provided in determining the conditions that are applied to execute the free game. As a result, the player feels a strong feeling of expectation concerning what type of free game will be played.

Fig. 6 is a flowchart showing an operation of the gaming machine in the free game. In the free game, the visible light lamps 3d are turned on to project the reflected virtual images of the physical reels 3a, 3b, 3c onto the first observation window 5a. In the free game, the effective paylines are selected in accordance with the result of the number-of-paylines lottery (step R1). Then, the rotation of the physical reels 3a, 3b, 3c is started (step R2). Then, three physical reels 3a, 3b, 3c are stopped sequentially after a predetermined time period has elapsed. That is, the first physical reel is stopped (step R3), then the second physical reel is stopped (step R4), and finally the third physical reel is stopped (step R5).

Then, it is determined whether or not the winning is hit (step R6). Then, if the winning is not hit, the process goes to step R8. In contrast, if the winning is hit in step R6, the payout of the medals corresponding the hit winning is executed (step R7). Then, it is determined whether or not the prescribed number of games has been finished (step R8). If the prescribed number of games has not been finished, the process goes to step R2. If the prescribed number of games has been finished, the free game is over. Then, the process goes back to the standby state of the primary game.

As described above, according to the gaming machine according to the present embodiment, the main symbols visualized under the visible light and the sub symbols visualized under the ultraviolet light are provided on the outer peripheral faces of the physical reels 3a, 3b, 3c. Therefore, the player can use properly the symbols to be observed if any one of the visible light and the ultraviolet light is selected appropriately and irradiated. Also, the half mirror 5b used to provide the main symbols as the reflected virtual image is provided on the inside of the first observation window 5a. Therefore, the main symbols can be displayed on the first observation window 5a in the direction along which it is difficult to display the main symbols because of the layout of the gaming machine.

Then, either of the visible light and the ultraviolet light can be irradiated to the physical reels 3a, 3b, 3c in accordance with the progress of game. Thus, any one of the observation windows provided at plural locations can be selected appropriately by either visualizing or invisualizing the symbols on the first observation window 5a and the second observation window 7a. Therefore, if the main symbols and the sub symbols are used separately, it is feasible to execute plural types of lotteries by using single physical reels 3a, 3b, 3c. As a result, new

game properties can be realized.

In this event, the symbols that are visualized or invisualized in accordance with the wavelength of light may be depicted on the outer peripheral faces of the physical reels 3a, 3b, 3c. Therefore, the symbols to be visualized can be used appropriately by changing the wavelength of light. Since plural types of lotteries can be executed by using the symbols appropriately, the variation of lotteries becomes abundant and thus the game presentation can be improved.